

Report for 2002NM1B: Geographic Information System for Water Resources Research Planning

Publications

- Water Resources Research Institute Reports:
 - Hawley, J.W. and J.F. Kennedy. 2004 (2005), Creation of a Digital Hydrogeologic Framework Model of the Mesilla Basin and Southern Jornada del Muerto Basin. New Mexico Water Resources Research Institute; prepared for Lower Rio Grande Water Users Organization; Technical Completion Report 332, 105 p., with plates and appendix on CD ROM (including June 2005 Addendum extending model into Rincon Valley and adjacent areas).
 - King, J.P., J.W. Hawley, J.W. Hernandez, J.F. Kennedy and E.L. Martinez. 2006. Study of Potential Water Salvage on the Tucumcari Project Arch Hurley Conservancy District: Phase I. A pre-appraisal-level study of the potential amount of saved-water and the costs of alternative methods of reducing carriage losses from district canals. New Mexico Water Resources Research Institute, Technical Completion Report No. 335, with plates and appendices on CD ROM.
- Other Publications:
 - Hawley, J.W., J.F. Kennedy, and M. Ortiz. 2005. Digital hydrogeologic-framework model of the western Hueco Bolson area, Texas and Chihuahua. New Mexico Water Resources Research Institute, New Mexico State University. Project Completion Report, prepared for California State University-Los Angeles (CSULA Purchase Order CGA46120/NMSU Acct # 20050644), 45 p., 2 plates.

Report Follows

GIS Project

Problem and Research Objectives

The New Mexico Water Resources Research Institute has become the focal point for geographic information system (GIS) data and information concerning water resources in New Mexico. It combines database management with digital mapping into spatial-tabular data models. These models are powerful tools for representing and manipulating earth-science information.

As use of Geographic Information Systems has grown and presented new opportunities, it also has raised a number of new issues and problems. Of increasing concern is the management of a growing collection of spatial data sets and applications programs. These data sets and programs are very expensive to produce but relatively easy to share, so there is a great incentive to avoid duplicating production efforts. The trend clearly is toward managing these elements in distributed spatial libraries.

The primary objective of the project is to increase availability and accessibility of water resource information to support water resource planning and management in the state. The first task provides spatial data library accessibility. This task maintains arrangements and establishes those necessary to provide access to spatial data maintained by other agencies and organizations. The second task, spatial data development, evaluates needs, establishes priorities, and undertakes development of spatial data that is otherwise unavailable. These efforts will be coordinated with cooperating agencies and organizations to ensure no duplication of effort and to establish guidelines for coverages and priorities. The principal investigators maintain, update as necessary, and make the data available to cooperating agencies and organizations through both formal and informal arrangements to facilitate water resource planning activities.

Methodology

A number of cooperative data sharing agreements have been entered into with state, federal, and local agencies and organizations to facilitate access and to develop spatial data. Others will be pursued as necessary. Research funded by the NMWRRI in many cases results in the development of data that can be represented in a spatial form and thus can contribute to the state data pool. Projects that have such a potential are adjusted as necessary to meet this secondary purpose.

The NMWRRI maintains a GIS laboratory consisting of computer workstations; data storage devices; input/output devices (color plotter, digitizer, etc.); software for mapping and analysis (ARC/Info); database development and visualization; and network systems. The laboratory is connected via fiber to the New Mexico State University computer network, and thereby to the Internet. The NMWRRI also maintains an Internet web server site through which both spatial and tabular water resource data can be provided.

Principal Findings and Significance

Various research activities are supported by the system for water resources planning in the state. The New Mexico Interstate Stream Commission provides grants to regional groups to support water resources planning. NMWRRI continues to be utilized by the NM Interstate Stream Commission to provide GIS mapping products for use in their plans and in public outreach. NMWRRI has helped many regional groups with GIS mapping products for use in their plans and in public outreach efforts.

Additionally, support has been given to the New Mexico/Texas Water Commission and various public entities of southern New Mexico for their planning activities. GIS mapping support is also provided to the Lower Rio Grande Water Users Organization.

Presentations utilizing the products of the database management system were given at the Annual Environmental Science Conference in Pasadena, CA on April 6, 2005; the 2005 New Mexico Water Research Symposium on August 16, 2005; and the CEA-CREST/SAHRA/EPWU Hueco Bolson Workshop 3 in El Paso TX on August 19, 2005. A report entitled "Digital Hydrogeologic-Framework Model of the Western Hueco Bolson Area, Texas and Chihuahua" was prepared for a project supported by California State University-Los Angeles.

Marquita Ortiz, a graduate student at New Mexico State University and WRRI's GIS Technician received an NMSU Cluster Mini-Grant award for her project entitled, *The Impacts of Land Use Change on Water Resources and Traditional Acequia Culture in North Central New Mexico*. She will work with co-investigators from several departments to examine and interpret land use changes in the Black Mesa Reach of the Rio Grande in northern New Mexico. Marquita will employ GIS, remote sensing, and aerial photography to study the land use changes.

This sophisticated mapping and geo-spatial database management system, originally designed to support WRRI-funded research activities, is now being used for external research grants (e.g., Creation of a Digital Hydrogeologic Framework Model of the Mesilla Basin and Southern Jornada del Muerto Basin; creation of maps for the purpose of water planning funded by the New Mexico Interstate Stream Commission; and pesticide management planning in the state funded by the New Mexico Department of Agriculture) by water resources management and planning agencies in the state. A research grant resulted in the creation of a regional geographic information system to support water planning in the Paso del Norte borderland area of the southwestern United States.

This is an ongoing project with new data continually being added to the database and assistance being given to produce specific GIS products upon request. Continued funding is anticipated from annual state appropriations, as well as pending agency awards.